

## NASDA's Role

Japan's space development activities are implemented primarily by the National Space Development Agency (NASDA) and the Institute of Space and Astronautical Science (ISAS), in cooperation with other related organizations, and in accordance with the Space Development Program established by the Space Activities Commission, an advisory committee to the Prime Minister.

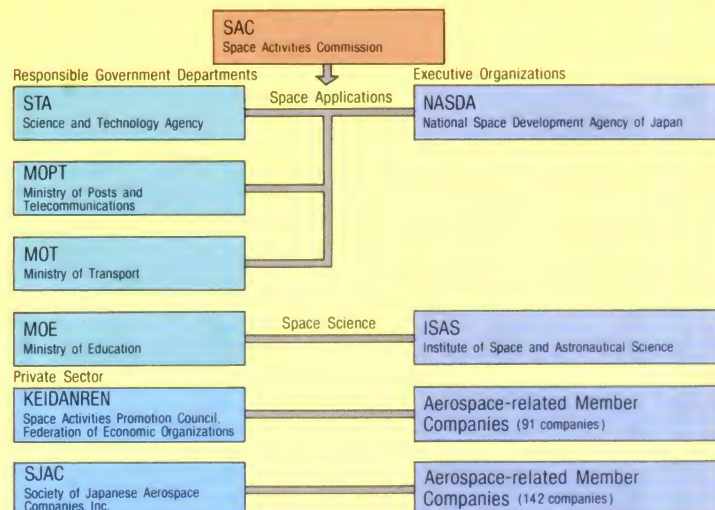
NASDA was established on October 1, 1969, under the provisions of the Law Concerning National Space Development Agency of Japan as a special corporate entity.

NASDA's activity is limited to solely peaceful purposes and is primarily engaged in the following projects;

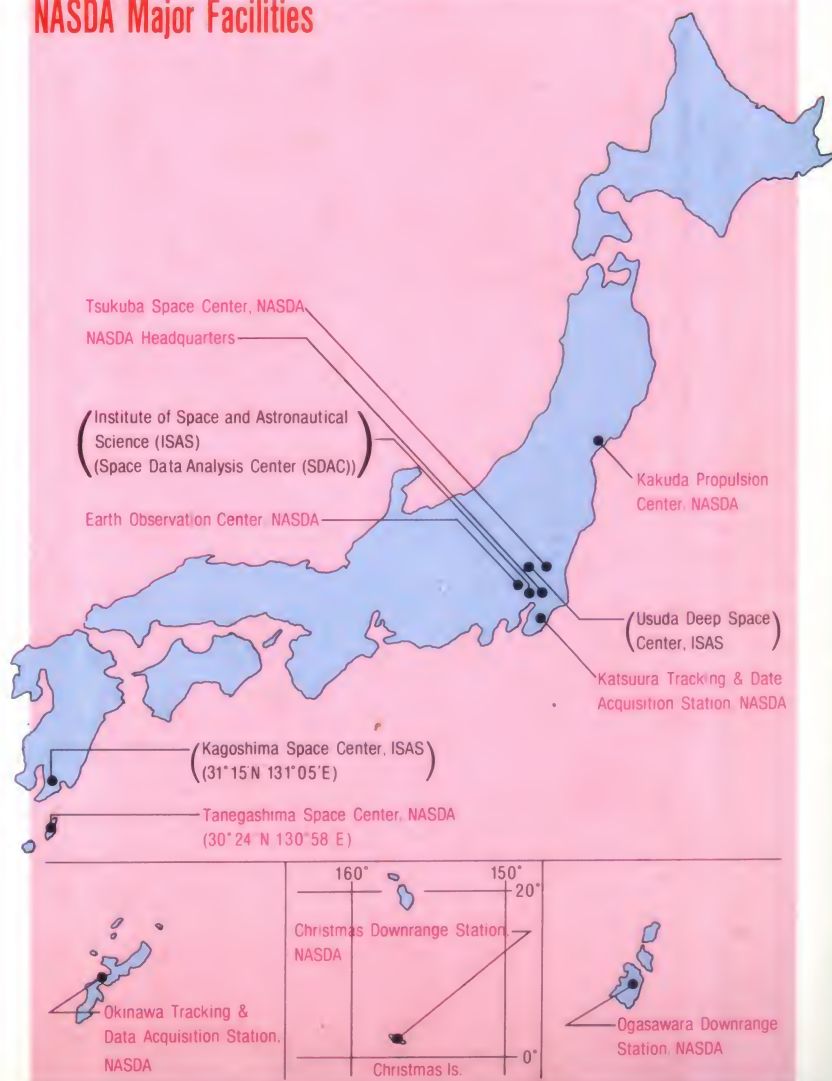
- Research and development of satellites and launch vehicles for practical purposes.
- Launch operations and tracking of these satellites.
- Promoting the development of remote sensing technologies.
- Promoting space experiments.

ISAS, on the other hand, promotes activities in the field of space science and is engaged in research, development, launching and operations of scientific satellites (like the Halley's comet probes, "SAKIGAKE" and "SUISEI") and rockets for these satellite launches.

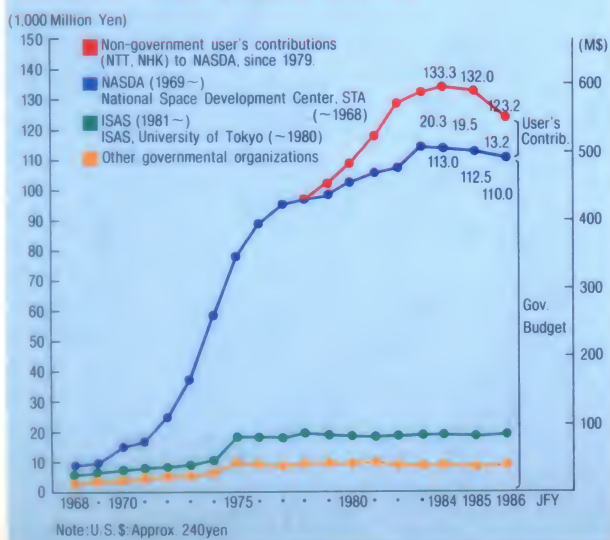
## Principal Organizations Involved in Japan's Space Development



## NASDA Major Facilities



## Budget for Japan's Space Activities



## NASDA Development Programs

NASDA's Development Programs fall broadly into five categories — earth observation, communications and broadcasting, space transportation, space experiments and basic technology.

By April 1986, NASDA had developed and launched a total of 17 satellites and the necessary launch vehicles. NASDA plans to develop 10 satellites and their launch vehicles by 1992.

In addition, NASDA has planned to conduct space experiments using the Spacelab/Space Shuttle. Activities for participation in the U.S. Space Station Program have also begun.

### ABBREVIATIONS

<b>BS-2</b>	Broadcasting Satellite-2 (BS-2a, BS-2b)
<b>BS-3</b>	Broadcasting Satellite-3 (BS-3a, BS-3b)
<b>BSE</b>	Medium-Scale Broadcasting Satellite for Experimental Purposes
<b>CS</b>	Medium-capacity Communications Satellite for Experimental Purposes
<b>CS-2</b>	Communications Satellite-2 (CS-2a, CS-2b)
<b>CS-3</b>	Communications Satellite-3 (CS-3a, CS-3b)
<b>ECS-b</b>	ECS Backup satellite
<b>ECS</b>	Experimental Communications Satellite
<b>EGP</b>	Experimental Geodetic Payload
<b>ERS-1</b>	Earth Resources Satellite-1
<b>ETS</b>	Engineering Test Satellite (ETS-I, ETS-II, ETS-III, ETS-IV, ETS-V, ETS-VI)
<b>FMPT</b>	First Material Processing Test (On board Space Shuttle/Spacelab)
<b>GEO</b>	Geostationary Earth Orbit
<b>GMS</b>	Geostationary Meteorological Satellite (GMS-2, GMS-3, GMS-4)
<b>H-I</b>	H-I Launch Vehicle
<b>H-II</b>	H-II Launch Vehicle
<b>ISS</b>	Ionosphere Sounding Satellite
<b>ISS-b</b>	ISS Backup satellite
<b>JEM</b>	Japanese Experimental Module attached to U.S. Space Station
<b>MOS-1</b>	Marine Observation Satellite-1
<b>N-I</b>	N-I Launch Vehicle
<b>N-II</b>	N-II Launch Vehicle
<b>TBD</b>	To be determined

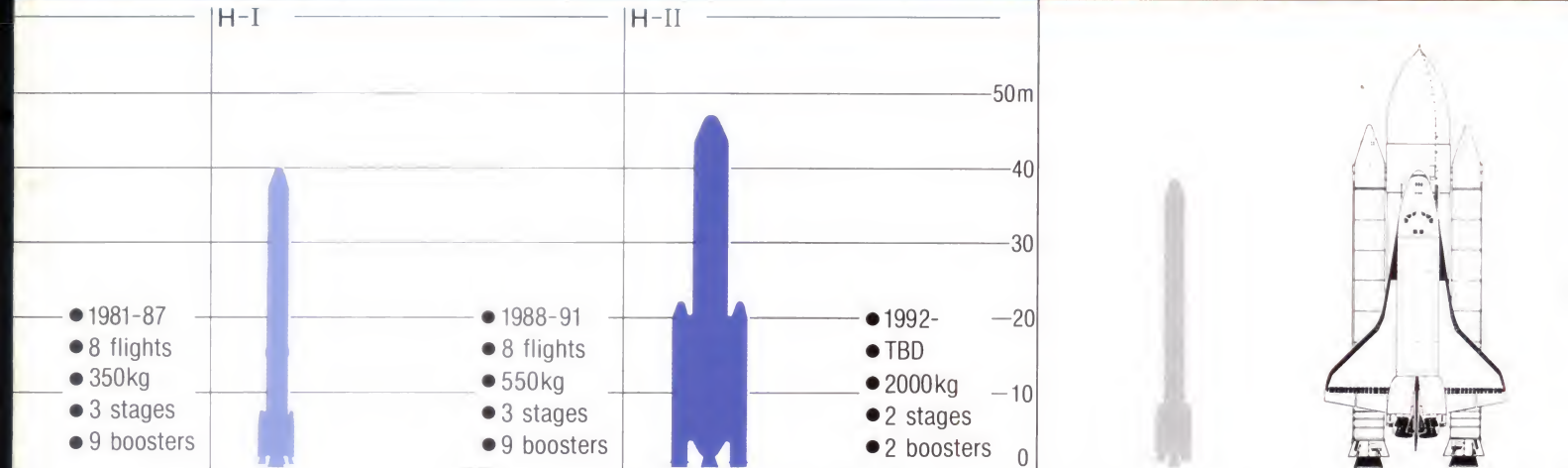
(Note) Figures in parentheses of each program show launch year.

BS-2b satellite launch using the N-II vehicle from NASDA's Tanegashima Space Center on Feb. 12, 1986









NASDA Space Development Programs		
	N-I	N-II
Development characteristics	Developed on the basis of U.S. Thor Delta technology	Improved version
Earth Observation Satellite Programs	ISS (1976) ISS-b (1978)	GMS-3 (1984)
Communications & Broadcasting Satellite Programs	ECS (1979) ECS-b (1980)	CS-2b (1982) BS-2b (1986)
Basic Technology Satellites Programs	ETS-I (1975) ETS-II (1977) ETS-III (1982)	GMS-3 (1984)
Space Experiment Programs		


Space Transportation Systems			U.S. Space Transportation Systems	
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Evolution of N-I	Domestic development of liquid oxygen / liquid hydrogen engine, solid motor, and inertial guidance system.	Employment of large-scale liquid oxygen / liquid hydrogen engine, etc. Multiple satellite launch capability.		
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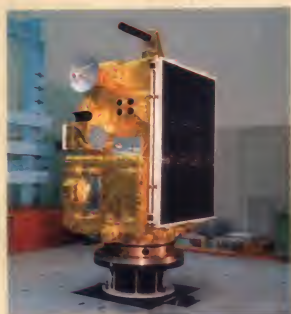
GMS-2 (1981) 	EGP (1986) 			GMS (1977 / Delta) 
	GMS-4 (1989) 			
MOS-1 (1987) 	ERS-1 (1991) 			

CS-2a (1983) 	CS-3a (1988) 			CS (1977 / Delta) 
	CS-3b (1988) 			
BS-2a (1984) 	BS-3a (1990) 			BSE (1978 / Delta) 
	BS-3b (1991) 			

ETS-IV (1981) 	ETS-V (1987) 	ETS-VI (1992) 		
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				FMPT* (1988 / Space Shuttle) 
				JEM (1992) 

# CURRENT NASDA PROJECTS



## Earth Observation

### Geostationary Meteorological Satellite-4 (GMS-4)

As follow-on to the service of its predecessors, GMS-4 development is in progress. It will contribute to the improvement of weather services not only in Japan but also in countries of the Asian and West Pacific regions, where 34 international stations have been established.

### Marine Observation Satellite-1 (MOS-1)

MOS-1, now under development, will observe marine phenomena, atmospheric water vapor, etc. and will be used for detection of mineral and energy resources, crop inventories, etc. Utilization of its data by international organizations is now under consideration. (Photo 1)

### Earth Resources Satellite-1 (ERS-1)

ERS-1 development is now in progress. ERS-1 is intended to monitor the natural environment including natural resources. It will employ an active sensing sensor that will operate both day and night, independent of climate.

### Experimental Geodetic Payload (EGP)

EGP, scheduled for launch in summer of 1986, is intended to improve the accuracy of geodetic surveys which currently use conventional triangulation networks. Its potential use by international organizations is currently under consideration.

## Communications & Broadcasting

### Communications Satellite-3 (CS-3a, CS-3b)

In order to meet growing communications demands and as follow-on to the current CS-2 service for domestic public communications, the CS-3a and CS-3b,



each with 6000 voice channels, are now under development.

### Broadcasting Satellite-3 (BS-3a, BS-3b)

To meet increasing broadcasting service demands and as follow-on to the current direct broadcast satellite service provided by BS-2, the BS-3a and BS-3b, each with three color TV channels, are now under development. (Photo 2)

## Basic Technology

### Engineering Test Satellite-V (ETS-V)

ETS-V, now under development, will perform mobile satellite communications experiments for ships and aircraft, in addition to various technological tests required for future satellites.

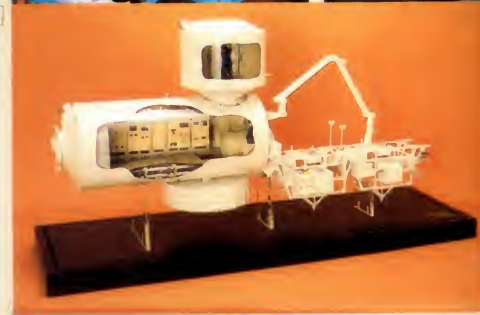
### Engineering Test Satellite-VI (ETS-VI)

ETS-VI, now under research, will perform various technological tests on two-ton class geostationary satellite, as well as advanced satellite communications experiments.

## Space Transportation

### H-II Launch Vehicle

Development has begun on the H-II launch vehicle, designed to serve as NASDA's main workhorse in the 1990s, with its proposed test flight in 1992. This will be a two-stage rocket with a large satellite fairing section enabling multiple satellite launches. Liquid oxygen/liquid hydrogen engines will be employed in its first and second stages, plus two solid fuel rocket boosters. Beside carrying satellites into low earth orbit (9 t) and geostationary earth orbit (2 t), H-II



will be capable of sending a payload into deep space, for example, to the moon (3 t) and Jupiter (0.5 t), thereby fulfilling a variety of users' demands. (Photo 3)

## Space Experiments

### The First Material Processing Test (FMPT)

FMPT is planned to be performed aboard the Spacelab/Space Shuttle. 34 experiments on material processing and life science will be made by a Japanese Payload Specialist (PS) aboard the Spacelab during the seven day flight test. (Photo 4: The three Japanese PSs now under training. From L to R, Dr. C. Naito, Dr. T. Doi, Dr. M. Mohri.)

### Participation in the U.S. Space Station Program

Since 1985, Japan has been participating in the Definition and Preliminary Design Phase activities of the Permanently Manned Space Station Program proposed by the United States. Japan is contributing its conception of the Japanese Experimental Module (JEM), which will include a pressurized module for use in material and life science tests, an exposed facility for materials, telecommunications and technological tests. (Photo 5: JEM)

**National Space  
Development Agency  
of Japan**



For additional information contact:  
Public Relations Division  
National Space Development Agency of Japan  
World Trade Center Building  
4-1, Hamamatsu-cho 2-chome, Minato-ku  
Tokyo 105 Japan  
Phone: 81-3-435-6111  
Telex: J28424 (AAB:NASDA J28424)  
FAX: 81-3-433-0796  
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